

PATENT APPLICATION

Attorney Docket No. P02177US (98236/3P)

TITLE OF THE INVENTION

"Fishing Reel Spool"

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CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation in part of U.S. Patent  
10 Application Serial No. 09/867,185 filed May 29,  
2001(scheduled to issue on August 26, 2003 as U.S. Patent  
No. 6,609,671), which itself claimed priority to U.S.  
Provisional Patent Application Serial No. 60/217,890, filed  
July 12, 2000, both of which are incorporated herein by  
15 reference.

Priority of U.S. Provisional Patent Application Serial  
No. 60/217,890, filed July 12, 2000, is hereby claimed.

This is a continuation in part of PCT Patent  
Application Serial No. PCT/US02/16778, having international  
20 filing date May 29, 2002, which in the U.S. was a  
continuation of U.S. Patent Application Serial  
No.09/867,185, filed May 29, 2001, both of which are  
incorporated herein by reference.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR  
25 DEVELOPMENT

Not applicable

REFERENCE TO A "MICROFICHE APPENDIX"

Not applicable

BACKGROUND OF THE INVENTION

30 1. Field of the Invention

The apparatus of the present invention relates to  
fishing reels and spool constructions, more particularly to  
fixed-spool (spinning) reels and an improved configuration  
for a fixed-spool (spinning) reel spool.

## 2. General Background of the Invention

Fixed-spool reels (commonly referred to as spinning reels) are currently the most popular reels used for sport fishing world-wide. While many different makes and models are offered to accommodate the varying needs of fishing enthusiasts, the basic design of most spinning reels is similar. Particularly, the spool of spinning reels, which serves to store the fishing line wound up by the reel, shows little variation between different models.

The casting distance that can be achieved with a given type of line and lure is largely dependent on the design of the spool. Many modern spinning reel spools feature a wide center portion, and are elongated and slightly cone-shaped, in an attempt to minimize line friction during the casting process. Typically, the line is fastened to these spools by attaching it firmly to the center portion of the spool with a knot. This mode of line attachment, however, leads to several problems common to spinning reels.

First, most of the knots used for line attachment are fairly bulky, since no angler wishes to risk the loss of a sizeable fish due to the loosening of the knot attaching the line to the spool. This knot, and the line end typically protruding from it, may significantly interfere with the even layering of the line wound subsequently on the spool, thereby decreasing the accuracy and distance achievable during the casting process. The more the spool is elongated, and the more its center portion is wide, the more will the body of the knot be located in proximity to the outer layers of the line. This partially offsets the advantages in casting distance and accuracy gained by modern spool design.

Second, inelastic lines with little inherent stretch, particularly modern braided lines, are difficult to attach firmly to the center portion of most spools. This problem increases at lower temperatures. In these situations,

cranking the handle of the reel will not lead to the taking up of line, but rather to the rotation of the entire coil of line around the spool.

Third, the process of removing old line from the spool is cumbersome. The line has to be manually pulled off from the spool, foot by foot, a time consuming and frustrating process that leaves a large heap of tangled line. Since many fishermen are put off by the prospect of the time consuming and boring process of line changing, many a "big one" gets away due to the breaking of old, damaged line.

Fourth, while an attempt to circumvent the above listed problems by hiding the knot inside the spool would solve some of the above problems, a new problem arises: Spinning reels, by universal design, are indeed "fixed spool reels", and are often referred to as such. They depend on the ability of the spool to change from a generally fixed attachment on the reel shaft assembly to rotational movements around that shaft when a strong fish sets the drag mechanism, preventing line breakage, in motion. Any such attempts to hide the knot inside the spool have to provide means to prevent any possibility of interference of the knot or parts of the fishing line with the rotational movements of the spool around the reel shaft assembly.

These considerations make it apparent that there exists the need for a new type of spinning reel spool, allowing not only for the quick removal of old line, but also for the firm attachment of new line, without the possibility of line loosening at the attachment site, or the possibility of interference of the knot with the casting process, or the possibility of interference of the knot or parts of the fishing line with the drag mechanism.

DESCRIPTION OF THE PRIOR ART

U.S. Patent No. 6,015,111 to Berke describes a spool having a detachable flange for removing damaged line. The

Berke patent does not relate to a fishing reel spool construction but rather to a separate line winding tool.

U.S. Patent No. 5,507,443 to Miyazaki discloses a notch in the barrel of a spool, for securing line.

5 U.S. Patent No. 5,195,699 to Stinnette teaches a spool that can be separated in two parts for line removal. The spool design does not offer any internal line attachment features. Moreover, the claims of the Stinnette patent demand that the spool have a parabolic contour, a feature  
10 that may facilitate line removal, but which is certain to interfere with the casting process, and which runs counter to the slightly conical mid-section design of modern spools intended for long-range casting.

U.S. patent No. 5,165,623 to Smith describes a fishing  
15 reel spool containing an elongated opening, generally parallel to the spool axis, with multiple smaller orthogonal side openings. Securement of line to the spool occurs through wedging of a preformed knot at the end of the line into smaller orthogonal portions of the  
20 longitudinal slot. Separation of the line from the spool is possible through retrograde movements of the line and detachment of the preformed knot from its wedged position.

U.S. Patent No. 5,120,003 to Sacconi discloses a fishing reel spool which can be threadably separated, and  
25 a cartridge spool which contains line and which fits over a first spool axle, both spools being reversibly locked together by a locking detent. The fishing reel spool is not designed to take up line directly without a cartridge spool.

30 U.S. Patent No. 4,196,864 to Cole teaches a line winding tool including a take-up spool with removable flange for removing line from a conventional fishing reel spool.

U.S. Patent No. 4,103,843 to Nothdurft teaches a  
35 fishing reel design which includes a spool and cover both

having an aperture. The fishing line is passed through both apertures and then knotted at the outside of the cover of the spool.

U.S. Patent Nos. 2,777,648; 2,696,951; and 2,669,400  
5 to Wood describe an arbor, to be mounted on the shaft of a conventional fishing reel spool, containing apertures for attachment of fishing line.

U.S. patent No. 2,309,146 to Whistler teaches a spool with a transverse bore through a hub portion and a spindle  
10 for passing one end of a fishing line to be wound on said spool.

U.S. patent No. 2,525,169 to Dodge, entitled "Cork Hub", issued October 10, 1950.

#### BRIEF SUMMARY OF THE INVENTION

15 The present invention provides a spinning reel and spool arrangement, wherein the spool is of two parts, an upper part, and a lower part. These parts can be assembled or taken apart using a simple mechanism of external and internal threads. Removal of old line now becomes very  
20 quick and hassle free: the two segments filled with line are simply taken apart, leaving immediately a neat coil of old line that can be discarded easily.

In addition, one of the two segments of the spool features a small opening at the site of attachment of the  
25 opposing segment. This opening is used to introduce the end of the line, which is then attached to a small wire loop on the inner surface of that same spool segment. This will lead to a secure connection of the line to the spool, eliminating possible gliding of the entire coil of line  
30 around the spool. The knot of the connection is hidden inside the spool, avoiding all interference of the knot with the smooth separation of line from the spool during the casting process. Since the knot is firmly attached to the interior of the spool, it cannot slip out of the  
35 opening.

By modifying the spool structure, the invention, iter alia, substantially shortens the process of line removal, provides for a secure connection of the line to the spool, and eliminates possible interference of the knot with the casting process.

A feature of the present invention is that the spool can be taken apart in a plurality of segments for easy line removal. The spool described uses a simple threading mechanism to join the two segments of the spool. An additional conventional locking mechanism could be used to prevent all accidental loosening of the connection, and/or any other conventional locking mechanism could be used instead of the threads to join the spool segments.

Another feature of the present invention is that the line is attached firmly to structural parts of the spool center, and not simply wound around the spool, thus preventing the slipping of the entire line coil. The invention described here uses a single opening and a wire loop connector at the inside of the spool for the fastening of the line. Multiple variations of this, using one or more openings, and/or various devices for the attachment of the line, could be used.

Another feature of the present invention is that the knot of the line connection is hidden inside the spool, thus avoiding possible interference with the casting process, yet being firmly connected to the spool, avoiding potential separation of the line end from the spool that may be caused by backward movements of the line.

Yet another feature of the present invention is that the knot, and those parts of the line which are located inside the spool, are separated from the shaft, upon which the spool is mounted. This assures that there is no possibility of interference of the knot or the fishing line with the main shaft and its attached components if the drag mechanism is put in motion when a big fish is played.

## BRIEF DESCRIPTION OF THE DRAWINGS

For better clarity, the illustrations do not feature any of the usual details at the upper and lower ends of the spool, nor its connection to the spool shaft or the drag system. These parts and details vary significantly between  
5 the many types and brands of spinning reels, yet they are of no particular importance to understand the this improved spool and reel design.

For a further understanding of the nature, objects,  
10 and advantages of the present invention, reference should be had to the following detailed description, read in conjunction with the following drawings, wherein like reference numerals denote like elements and wherein:

Figure 1 is an exploded perspective view of a  
15 preferred embodiment of the apparatus of the present invention showing the separated parts of the spool, as well as the end of fishing line being attached to the spool;

Figure 2a is an end view of the assembled parts of the spool;

20 Figure 2b is a sectional end view of the spool;

Figure 2c is a top view of the lower portion of the spool;

Figure 2d is an end view of the separated parts of the spool;

25 Figure 2e is an exploded perspective view of the separated parts of the spool;

Figure 3a is an end view of a traditional spool, showing the attachment of line;

Figure 3b is an end view of a traditional spool,  
30 showing several layers of line;

Figure 3c is an end view of the spool, showing the attachment of line;

Figure 3d is an end view of the spool, showing several layers of line;

35 Figure 4a is an end view of a traditional spool,

showing the process of line removal therewith;

Figure 4b is an end view of the separated parts of the spool, showing the process of line removal;

Figure 5 is an exploded perspective view of the disassembled parts of the spool, and their position in relation to a spinning reel, on which they are mounted; and

Figure 6 shows a spinning reel featuring the spool, mounted on a fishing rod.

#### DETAILED DESCRIPTION OF THE INVENTION

Figures 5 and 6 depict the preferred embodiment of the apparatus of the present invention, designated generally by the numeral 39.

Figure 1 shows the separated parts of the spool 38, including distal part 36, and proximal part 37. Distal part 36 features a central aperture 10, allowing part 36 to fit over middle tube 24 of proximal part 37. Distal part 36 features distal flange 11 and middle section 12 of spool 38. Proximal part 37 and distal part 36 connect reversibly via external threads 18 and internal threads 25 of the proximal 37 and distal 36 spool parts, respectively.

In figure 1, a middle tube 24 is provided on proximal part 37. Line attachment loop 15 allows fishing line 21 to be secured to proximal part 37 by means of a knot 16. At its distal end, middle tube 24 features end piece 14. Line 21 exits spool 38 via line aperture 20.

Of note, while aperture 20 has been depicted with edges, to improve clarity of the drawing, it should be emphasized that smooth contours of aperture 20 are essential to avoid damage to line 21. Once line 21 has been attached to attachment loop 15, it is lead out of proximal part 37 via line aperture 20. Distal part 36 is then reversibly attached to proximal part 37 through threads 18,25. As is evident from this and subsequent figures, this assembly prevents knot 16 from coming into contact with either the exterior of spool 38, or with main



shaft assembly 30 (Fig 5), on which spool 38 is mounted.

Figure 2a shows distal 36 and proximal 37 parts of spool 38 assembled. Spool 38 resembles a traditional spool 26, spool 38m featuring an elongated middle section 12, and  
5 smooth proximal 22 and distal 11 flanges, and, proximally, a skirted spool section 23. Separation line 19 marks where parts 36 and 37 are reversibly joined. Adjacent and below separation line 19, line aperture 20 is visible.

Figure 2b is a sectional view of spool 38 shown in  
10 figure 2a. Note that end piece 14 of middle tube 24 can be flush with the interior surface of distal part 36.

Figure 2c shows proximal part 37 from the top. Easily seen are central aperture 13 of middle tube 24 (which can receive main shaft assembly 30 as shown in figure 5), as  
15 well as end piece 14, attachment loop 15, distal rim 17 of proximal threaded portion 18, separation line 19, and proximal flange 22. Figs. 2d and 2e show these same parts when separated, using an end view and an exploded perspective view, respectively.

20 Figures 3a-d compare the line attachment to a traditional spool 26 (figures a-b) with the attachment of line to spool 38, illustrating one of the advantages of the invention. Traditional spool 26, as depicted in figure 3a, features, like most modern spools, a fairly elongated and  
25 wide middle section 12, allowing for less friction during the casting process. Using this elongated and wide middle section, the diameter of layer 27 of fishing line 21 wound around the spool is relatively thin. Knot 16 therefore occupies significant space in relation to layer 27. Figure  
30 3b illustrates that, during long distance casts, when lower layers of line 21 are exposed, knot 16 actually hinders line 21, as it is paid out rapidly in a direction parallel to the long axis of spool 26.

Figures 3c and 3d feature that same process of line  
35 attachment and line payout for spool 38. As illustrated in

Figure 3c, shape and contour of spool 38 resemble traditional spool 26, however, knot 16 now is hidden inside spool 38. Therefore, there is no possibility of interference of knot 16 with line 21, and the casting process, as shown in figure 3d, becomes smooth and unobstructed.

Figure 4 compares the process of line removal from a traditional spool 26 (figure 4a), and from the new and improved spool 38 (figure 4b). Line 21 has to be stripped off traditional spool 26 by hand, leading to the formation of a voluminous entanglement of fishing line, known to fishermen by the slang term "birds nest" 28, and to aggravation of the fisherman. Moreover, since this discarded line 21 is difficult to store, some unscrupulous anglers will leave bird's nest 28 behind in nature, where it may entangle and kill wildlife. Figure 4b shows the removal process with spool 38. It is remarkably quick and easy to operate as a few turns will separate distal part 36 from proximal part 37, leaving a neat coil of layers 27 of fishing line 21 for easy and space saving disposal.

Figure 5 shows spool 38 in relation to standard parts of a spinning reel 39. Like traditional long-skirted spools, spool 38 fits with its skirted section 23 over the corresponding portion of rotor 32. Middle tube 24 receives main shaft assembly 30, thereby effectively separating line 21, attached to loop 15 on the exterior of middle tube 24, from central aperture 13, which defines the interior of middle tube 24. Should therefore a big fish put the drag mechanism in motion, an event that will not fail to happen, given new reel 39's multiple advantages, spool 38 will rotate without interference of line 21 or knot 16 with main shaft assembly 30. Please note that standard items necessary to effectively secure spool 38 on main shaft assembly 30, such as washers, nuts, and retainers, are not depicted for clarity.

Figures 5 and 6 depict improved fishing reel apparatus 39 including spool 38 mounted on fishing reel apparatus 39, and fishing reel apparatus 39 assembled with a fishing rod 35.

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# PARTS LIST

The following is a list of suitable parts and materials for the various elements of the preferred embodiment of the present invention.

	<u>Parts Number</u>	<u>Description</u>
10	10	central aperture of spool
	11	distal flange of spool
	12	middle section of spool
	13	central aperture of middle tube
	14	end piece of middle tube
15	15	line attachment loop
	16	knot
	17	distal rim of lower threaded portion
	18	threads of proximal part of spool
	19	separation line between proximal and
20		distal spool parts
	20	line aperture
	21	fishing line
	22	proximal flange of spool
	23	skirted section of spool
25	24	middle tube
	25	threads of distal part of spool
	26	traditional spool
	27	layers of fishing line
	28	bird's nest
30	29	drag knob
	30	main shaft assembly
	31	bail arm
	32	rotor
	33	reel body
35	34	handle assembly

	35	fishing rod
	36	distal part of spool
	37	proximal part of spool
	38	spool and spinning reel apparatus
5	39	improved fishing reel
	40	fishing apparatus

The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.